



Cambridge IGCSE™

COMBINED SCIENCE

0653/11

Paper 1 Multiple Choice (Core)

October/November 2020

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

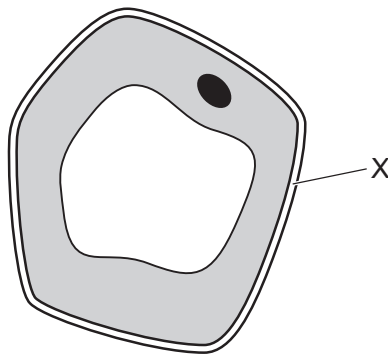
This document has **16** pages. Blank pages are indicated.

- 1 A motor car has many features that are similar to the characteristics of living things.

Which characteristic of living organisms **cannot** be matched to a feature of a car?

- A release of energy by breaking down energy-rich molecules
- B release of waste materials
- C reproduction of a similar version of itself
- D takes in materials for energy

- 2 The diagram shows a cell.



What is the function of X?

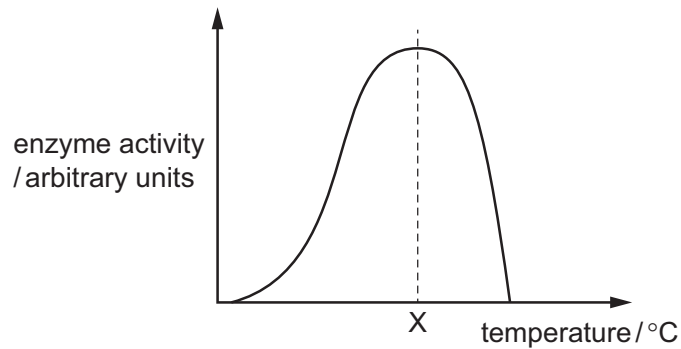
- A contains the genetic information
- B controls substances entering and leaving the cell
- C maintains the shape of the cell
- D photosynthesis

- 3 A sample of food contains only fat, protein and water.

Which food tests give a positive result when the sample is tested?

	Benedict's solution	biuret solution	ethanol emulsion	iodine solution
A	✓	✓	x	x
B	✓	x	x	✓
C	x	✓	✓	x
D	x	✓	✓	✓

- 4 The diagram shows how the activity of an enzyme changes with temperature.



This enzyme works in the human body.

What is the most likely value of temperature X?

- A** 10 °C **B** 40 °C **C** 70 °C **D** 100 °C
- 5 What is necessary for photosynthesis?

- 1 carbon dioxide
- 2 chlorophyll
- 3 glucose
- 4 light
- 5 oxygen
- 6 water

- A** 1, 2, 4 and 6
B 1, 3, 4 and 6
C 2, 3, 4 and 5
D 3, 4, 5 and 6
- 6 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
A	inside	inside
B	inside	outside
C	outside	inside
D	outside	outside

7 Which statement about the pulmonary vein is correct?

- A It carries blood from the heart to the body.
- B It carries blood from the heart to the lungs.
- C It carries blood to the heart from the body.
- D It carries blood to the heart from the lungs.

8 Which statement about adrenaline is correct?

- A It is produced by a gland.
- B It is transported in the red blood cells.
- C It only has one target organ.
- D It reduces the size of the pupils.

9 Which row about whether roots and shoots respond to gravity is correct?

	respond to gravity	
	roots	shoots
A	no	no
B	no	yes
C	yes	no
D	yes	yes

10 Which row describes asexual reproduction?

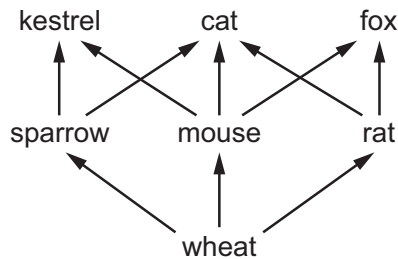
	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

11 Which conditions are needed for the germination of seeds?

- 1 oxygen
- 2 suitable temperature
- 3 water

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

12 The diagram shows a food web.

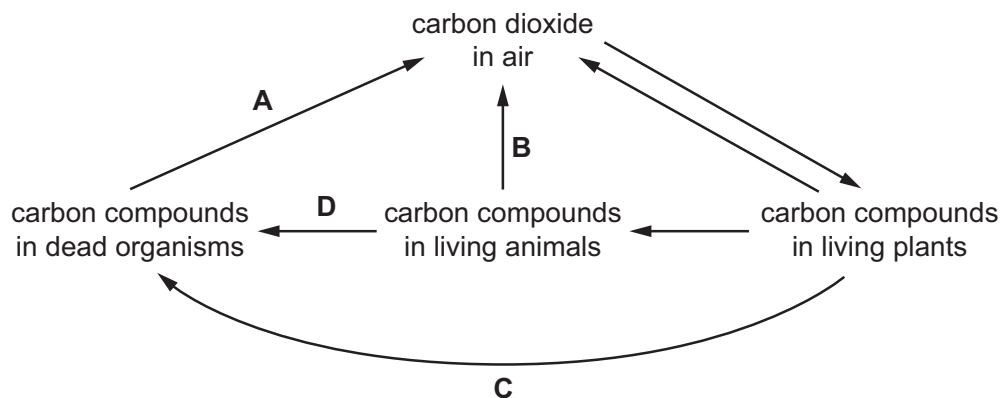


Which sentence correctly describes an organism in the food web?

- A** The cat is a herbivore and consumer.
- B** The kestrel is a carnivore and consumer.
- C** The mouse is a herbivore and producer.
- D** The sparrow is a carnivore and consumer.

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?

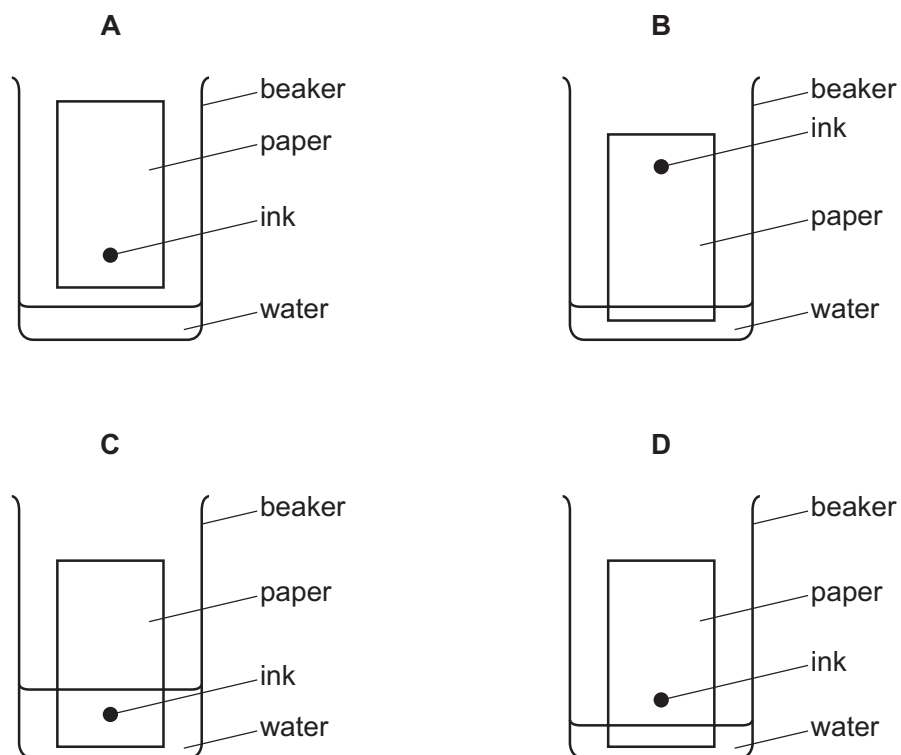


14 Which term describes ammonia, NH_3 ?

- A element
- B ion
- C atom
- D molecule

15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



16 Sugar dissolves in water to form sugar solution.

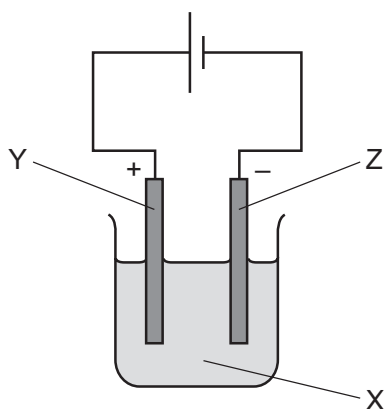
Which word describes the sugar?

- A distillate
- B filtrate
- C solute
- D solvent

17 Which equation is balanced?

- A** $\text{Cu} + \text{O}_2 \rightarrow \text{CuO}$
B $2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$
C $2\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
D $2\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$

18 The diagram shows apparatus used for electrolysis.



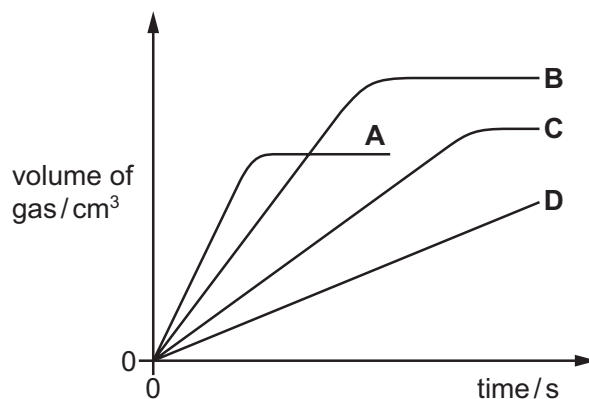
What are X, Y and Z?

	X	Y	Z
A	electrode	anode	cathode
B	electrode	cathode	anode
C	electrolyte	anode	cathode
D	electrolyte	cathode	anode

19 Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
A	decreases	increases
B	decreases	no change
C	increases	decreases
D	increases	no change

20 Which line on the graph represents the reaction with the greatest rate?



21 Which substances react with dilute sulfuric acid to make copper sulfate?

- 1 copper
- 2 copper carbonate
- 3 copper hydroxide
- 4 copper nitrate

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

23 Which statement about the Periodic Table is **not** correct?

- A It lists all the known elements.
- B Non-metallic elements are placed on the right-hand side.
- C The position of an element helps us to predict its properties.
- D Vertical columns in the Periodic Table are called periods.

24 Ammonia, NH_3 , can be made by combining the gases nitrogen, N_2 , and hydrogen, H_2 .

This reaction is slow.

When element Y is added, the rate of reaction increases.

What is Y?

- A Al B Fe C Rb D I_2

25 Which method is used to extract copper from copper(II) oxide?

- A dissolving copper(II) oxide in hydrochloric acid and then filtering
- B dissolving copper(II) oxide in water and then filtering
- C heating the copper(II) oxide
- D heating the copper(II) oxide mixed with carbon

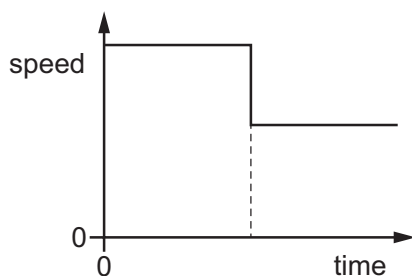
26 Which process does **not** produce carbon dioxide?

- A fractional distillation of petroleum
- B the complete combustion of methane
- C the reaction between an acid and a carbonate
- D the thermal decomposition of calcium carbonate

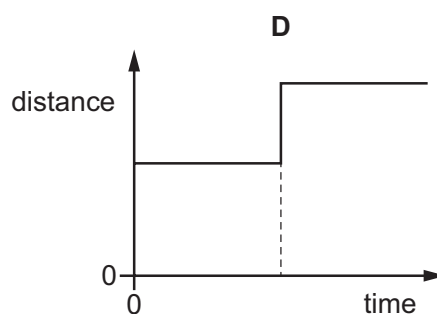
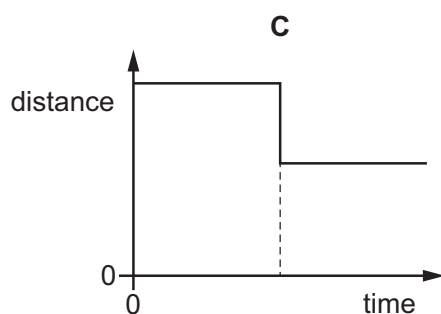
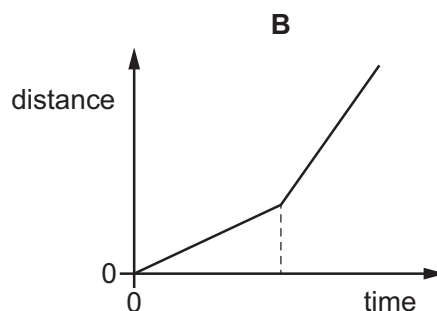
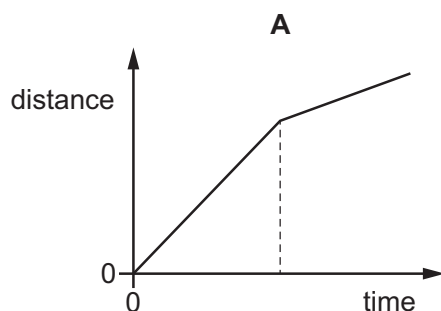
27 Which statement describes a hydrocarbon?

- A a compound that burns to form carbon dioxide and hydrogen
- B a compound that contains carbon and hydrogen only
- C a compound that only contains ionic bonds
- D a compound that reacts easily with metals

- 28** The diagram shows the speed–time graph for a car travelling along a horizontal road.



What is the distance–time graph for this part of the journey?



- 29** A solid metal cube of side 5.0 cm has a mass of 250 g.

What is the density of the metal?

- A** 0.50 g/cm³ **B** 2.0 g/cm³ **C** 10 g/cm³ **D** 50 g/cm³

- 30** A raindrop falls vertically at a constant speed.

What is the resultant force on the raindrop as it falls?

- A** It is equal to the air pressure on the drop.
B It is equal to the air resistance on the drop.
C It is equal to the weight of the drop.
D It is zero.

- 31** An object is not moving. Work is done on the object and it moves a known distance.

What other single measurement is needed to calculate the amount of work done?

- A** the acceleration of the object
- B** the direction of movement of the object
- C** the force applied to the object in the direction of movement
- D** the speed of the object

- 32** An apple falls to the ground.

Which form of energy decreases as the apple falls?

- A** chemical potential
- B** gravitational potential
- C** kinetic
- D** sound

- 33** What happens as a liquid starts to evaporate?

- A** The mass of the remaining liquid increases.
- B** The mass of the remaining liquid is constant.
- C** The temperature of the remaining liquid decreases.
- D** The temperature of the remaining liquid increases.

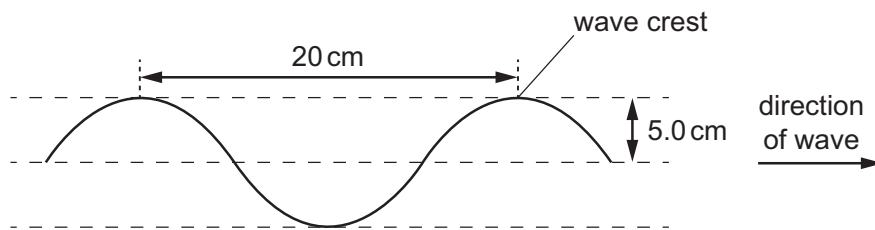
- 34** In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

35 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

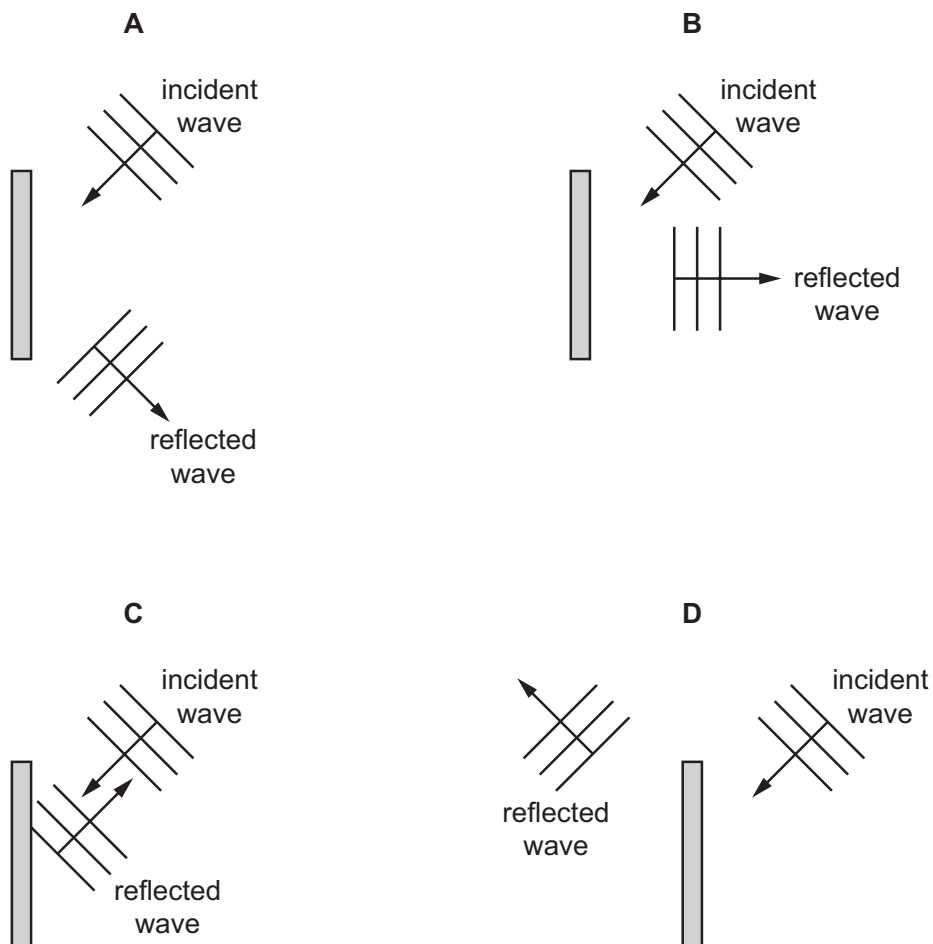


What is the speed of the wave?

- A** 4.0 cm/s **B** 5.0 cm/s **C** 20 cm/s **D** 80 cm/s

36 A water wave strikes a plane barrier.

Which diagram shows the direction of travel of the reflected wave?



37 Which substance is an electrical insulator?

- A aluminium
- B copper
- C plastic
- D steel

38 A power supply causes a current in a circuit.

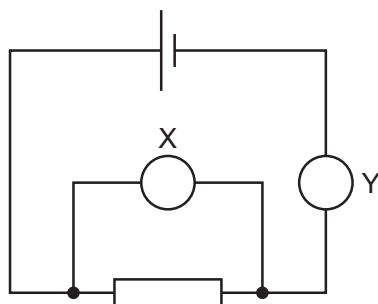
The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

39 The diagram shows a cell connected to a resistor and two meters, X and Y.

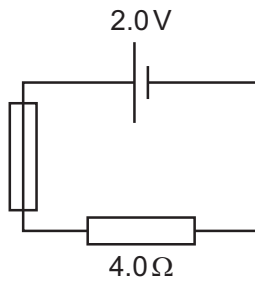
The circuit is used when determining the resistance of the resistor.



What are the quantities measured by meters X and Y, and what are their correct units?

	meter X		meter Y	
	quantity	unit	quantity	unit
A	current	A	p.d.	V
B	current	V	p.d.	A
C	p.d.	A	current	V
D	p.d.	V	current	A

- 40 The diagram shows a circuit containing a 2.0 V cell, a fuse and a resistor of resistance $4.0\ \Omega$.



What is the most appropriate rating for the fuse?

- A** 0.4 A **B** 1 A **C** 2 A **D** 5 A

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The Periodic Table of Elements

Group																				
I	II	Key												III	IV	V	VI	VII	VIII	
		atomic number atomic symbol name relative atomic mass																		
3 Li lithium 7	4 Be beryllium 9													5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20	
11 Na sodium 23	12 Mg magnesium 24													13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40	
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84			
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131			
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —			
87 Fr francium —	88 Ra radium —	89–103 actinoids	104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —		114 Fl flerovium —		116 Lv livermorium —					

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).



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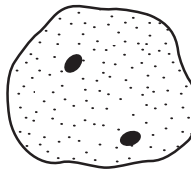
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- 1 A plant is placed next to a window. After a few days, its leaves face the light.

Which characteristic is this displaying?

- A excretion
- B nutrition
- C respiration
- D sensitivity

- 2 The diagram shows a cell from an animal's liver.



In what way does this cell differ from a typical animal cell?

- A It contains a central vacuole.
 - B It contains cytoplasm.
 - C It contains two nuclei.
 - D It has a cell wall.
- 3 Particles move from one area to another by diffusion.

Which row is correct about this movement?

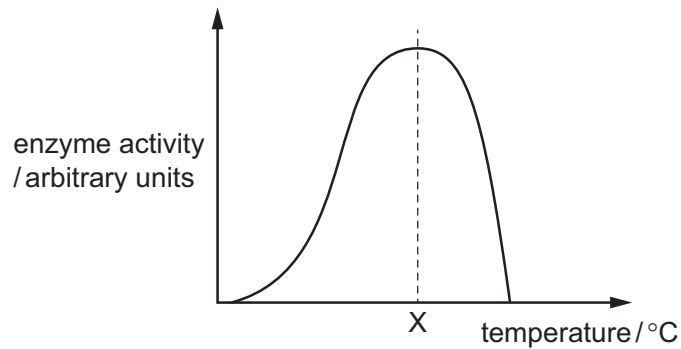
	concentration of particles in area from which they move	concentration of particles in area to which they move	movement of molecules
A	high	high	in a pattern
B	high	low	random
C	low	high	random
D	low	low	in a pattern

- 4 A student has samples of food and wants to test them for starch.

What should the student use to do this?

- A Benedict's solution
- B iodine solution
- C limewater
- D water and ethanol

- 5 The diagram shows how the activity of an enzyme changes with temperature.



This enzyme works in the human body.

What is the most likely value of temperature X?

- A 10 °C
 - B 40 °C
 - C 70 °C
 - D 100 °C
- 6 Corals are animals found in the sea. They can only survive if they live in a close relationship with algae. Algae can photosynthesise.

What do the algae produce that corals can use to survive?

	carbon dioxide	chlorophyll	glucose	oxygen
A	✓	✓	x	x
B	✓	x	x	✓
C	x	✓	✓	x
D	x	x	✓	✓

- 7 Some undigested food passes out of the digestive system as faeces.

What is this process?

- A absorption
- B digestion
- C egestion
- D ingestion

- 8 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
A	inside	inside
B	inside	outside
C	outside	inside
D	outside	outside

- 9 Which blood vessel carries blood from the heart to the lungs?

- A aorta
- B pulmonary artery
- C pulmonary vein
- D vena cava

- 10 What are the effects of adrenaline on the human body?

	breathing rate	pulse rate
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

11 Which row describes asexual reproduction?

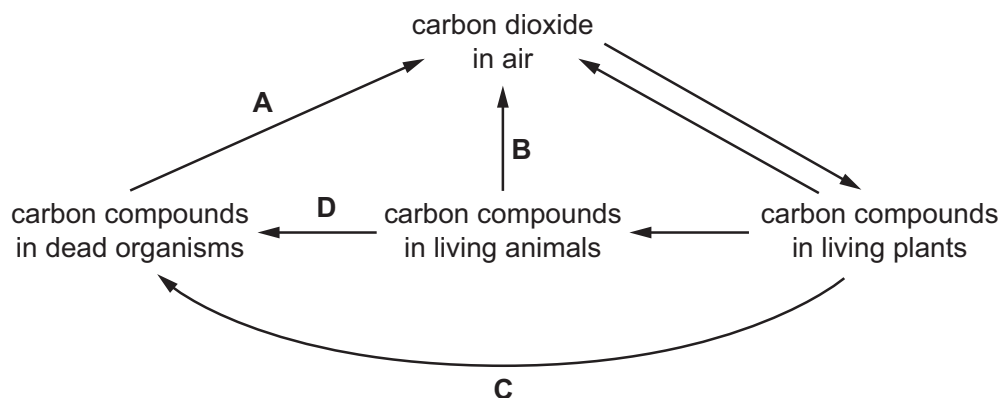
	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

12 On which part of a flower is pollen deposited during pollination?

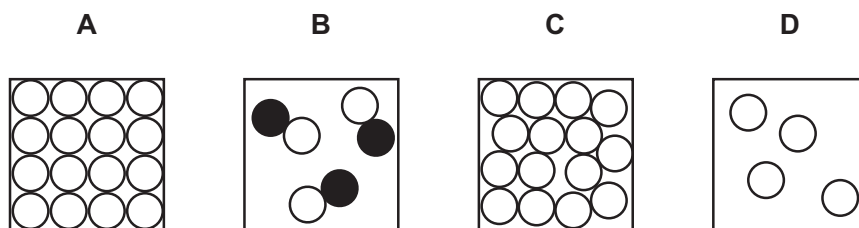
- A** ovary
- B** stamen
- C** stigma
- D** style

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?

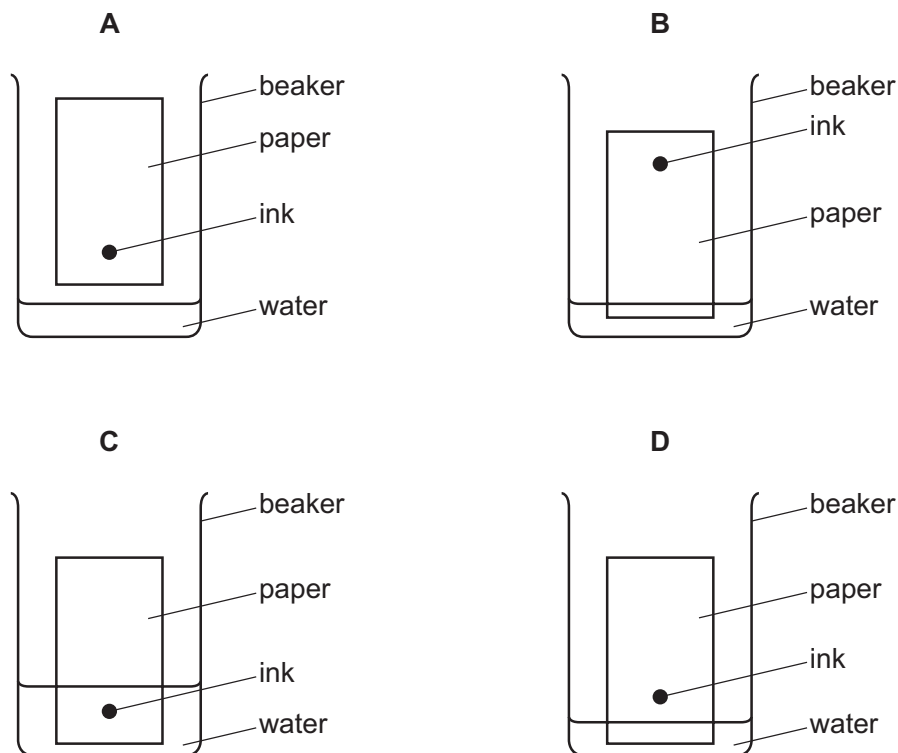


14 Which diagram represents particles in a gaseous element?



15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



16 Which processes are physical changes?

- 1 burning methane gas
- 2 dissolving sugar in water
- 3 evaporating ethanol
- 4 melting an ice cube
- 5 rusting of iron

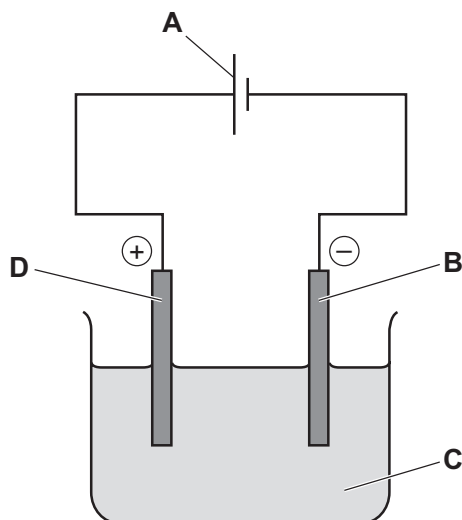
A 1, 3 and 4 **B** 1, 4 and 5 **C** 2, 3 and 4 **D** 2, 3 and 5

17 Which equation for the complete combustion of propane, C_3H_8 , is correct?

- A** $C_3H_8 + 2O_2 \rightarrow 3C + 4H_2O$
- B** $2C_3H_8 + 3O_2 \rightarrow 6CO + 8H_2$
- C** $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
- D** $C_3H_8 + 3O_2 \rightarrow 3CO_2 + 4H_2$

18 The diagram shows the electrolysis of molten lead(II) bromide.

Which label shows the cathode?



19 Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
A	decreases	increases
B	decreases	no change
C	increases	decreases
D	increases	no change

20 Magnesium reacts with zinc oxide to form magnesium oxide and zinc.

Which substance is reduced in this reaction?

- A** magnesium
- B** magnesium oxide
- C** zinc
- D** zinc oxide

21 Dilute hydrochloric acid is tested with universal indicator and with calcium carbonate.

Which row shows the results?

	pH	reaction with calcium carbonate
A	2	a colourless gas is given off
B	2	no reaction
C	10	a colourless gas is given off
D	10	no reaction

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

23 Which row describes a Group I element?

	metal or non-metal	reaction with water
A	metal	fast reaction
B	metal	no reaction
C	non-metal	fast reaction
D	non-metal	no reaction

24 Substance X is a coloured solid.

Substance X acts as a catalyst for the reaction between zinc and dilute sulfuric acid.

Molten X can be electrolysed.

What is X?

- A** a Group I compound
- B** a Group I metal
- C** a transition metal compound
- D** a transition metal

25 Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

26 Which processes are used in water treatment?

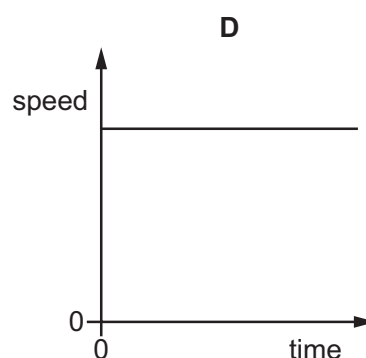
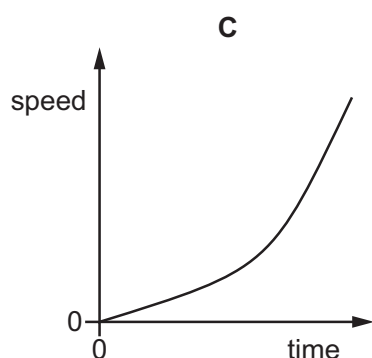
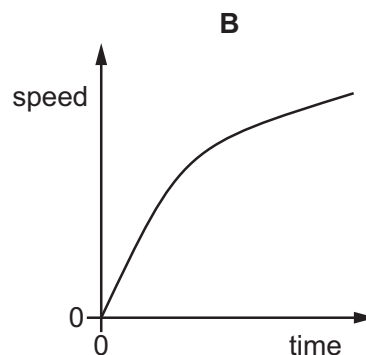
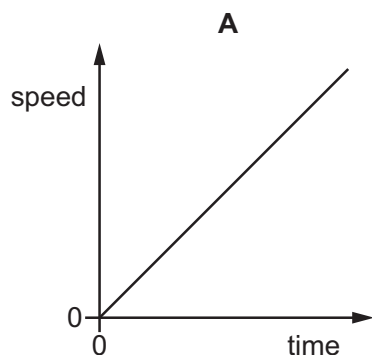
- 1 chlorination
- 2 cracking
- 3 filtration

- A** 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

27 Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

28 Which speed–time graph represents motion for which the acceleration is constant but **not** zero?



29 A solid metal cube of side 5.0 cm has a mass of 250 g.

What is the density of the metal?

- A** 0.50 g/cm³ **B** 2.0 g/cm³ **C** 10 g/cm³ **D** 50 g/cm³

30 A car powered by a petrol (gasoline) engine is driven along a horizontal road.

How is energy stored in the petrol and what form of energy does the car have because it is moving?

	energy in petrol	energy of moving car
A	chemical potential	gravitational potential
B	chemical potential	kinetic
C	electrical	gravitational potential
D	electrical	kinetic

31 The molecules of a liquid are close together.

What are other features of the molecules in a liquid?

- A** They are arranged in a regular pattern but change positions with each other.
- B** They are arranged in a regular pattern and vibrate about fixed positions.
- C** They are arranged randomly and change positions with each other.
- D** They are arranged randomly and vibrate about fixed positions.

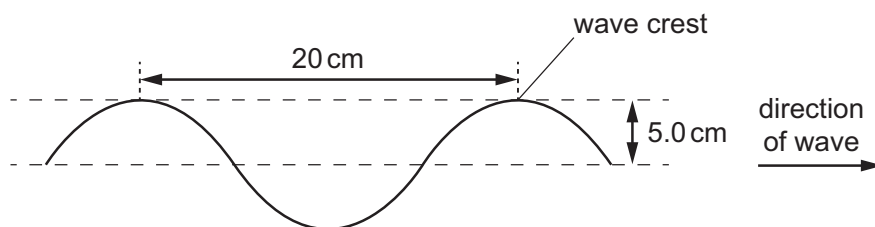
32 In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

33 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

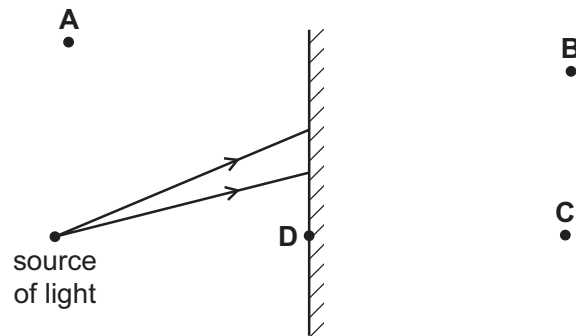


What is the speed of the wave?

- A** 4.0 cm/s
- B** 5.0 cm/s
- C** 20 cm/s
- D** 80 cm/s

- 34 A source of light is placed in front of a plane mirror.

Which labelled point shows the position of the image of the source?



- 35 Radio waves, visible light and X-rays all travel in a vacuum.

Which wave travels at the greatest speed?

- A radio waves
 - B visible light
 - C X-rays
 - D they all travel at the same speed
- 36 Which is **not** able to transmit sound waves?
- A a gas
 - B a liquid
 - C a solid
 - D a vacuum
- 37 A positively charged sphere hangs from an insulating thread.

A student brings a rod close to the sphere.

The sphere moves away from the rod.

Which conclusion can the student draw about the rod?

- A It is charged but it is not possible to know whether it is negatively or positively charged.
- B It is negatively charged.
- C It is not charged.
- D It is positively charged.

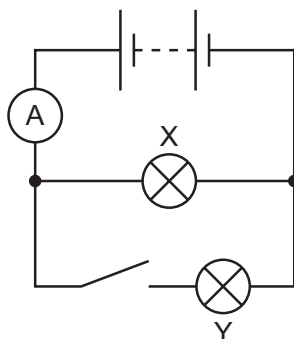
38 A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

39 The diagram shows an electric circuit. The switch is closed and both lamps are lit.



Lamp Y is now switched off. Lamp X remains lit.

What happens to the reading on the ammeter?

- A** It decreases to zero.
- B** It decreases but to a value greater than zero.
- C** It stays the same.
- D** It increases.

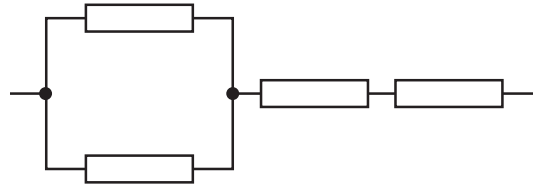
40 The diagrams show four identical resistors connected in different combinations.

Which combination has the greatest combined resistance?

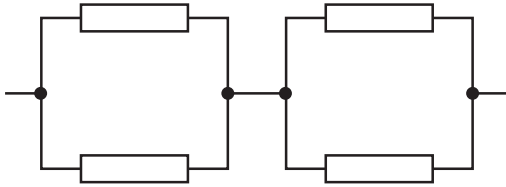
A



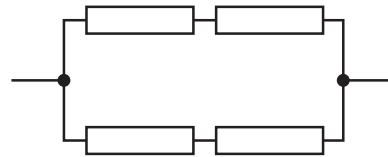
B



C



D



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Group

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).



Cambridge IGCSE™

COMBINED SCIENCE

0653/13

Paper 1 Multiple Choice (Core)

October/November 2020

45 minutes

You must answer on the multiple choice answer sheet.

You will need: Multiple choice answer sheet
Soft clean eraser
Soft pencil (type B or HB is recommended)

INSTRUCTIONS

- There are **forty** questions on this paper. Answer **all** questions.
- For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in soft pencil on the multiple choice answer sheet.
- Follow the instructions on the multiple choice answer sheet.
- Write in soft pencil.
- Write your name, centre number and candidate number on the multiple choice answer sheet in the spaces provided unless this has been done for you.
- Do **not** use correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.

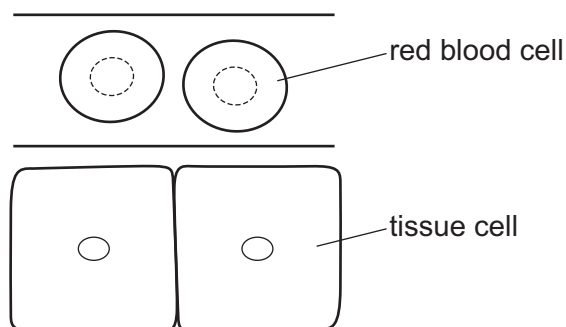
INFORMATION

- The total mark for this paper is 40.
- Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
- Any rough working should be done on this question paper.
- The Periodic Table is printed in the question paper.

This document has **20** pages. Blank pages are indicated.



- 1 The diagram shows two red blood cells inside a capillary and two tissue cells near this capillary.

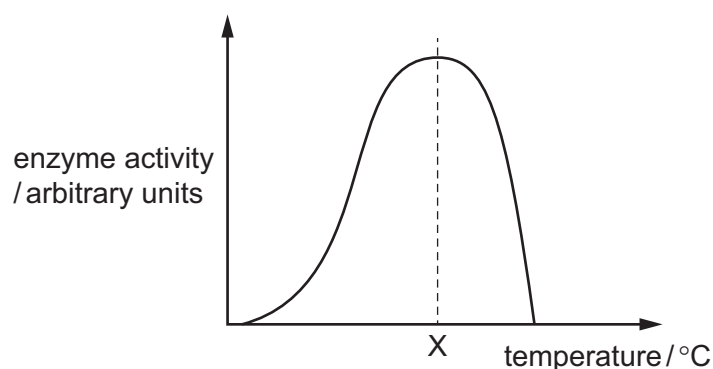


How does the oxygen in the red blood cells reach the tissue cells?

- A by absorption
 - B by diffusion
 - C by respiration
 - D by transpiration
- 2 Which row is correct?

	substance	elements contained in substance			
		carbon	hydrogen	nitrogen	oxygen
A	carbohydrates	✓	✓	✓	✗
B	carbohydrates	✓	✓	✗	✗
C	proteins	✓	✓	✓	✓
D	proteins	✗	✓	✓	✓

- 3 The diagram shows how the activity of an enzyme changes with temperature.

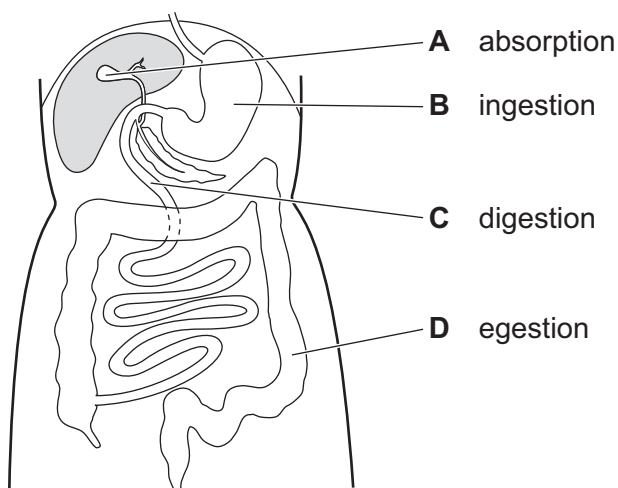


This enzyme works in the human body.

What is the most likely value of temperature X?

- A 10 °C
- B 40 °C
- C 70 °C
- D 100 °C

- 4 Which label gives the correct function of that region of the alimentary canal and its associated organs?



- 5 Which breakdown processes occur inside cells, and which occur outside cells?

	large molecules to small molecules for absorption	breakdown of glucose to release energy
A	inside	inside
B	inside	outside
C	outside	inside
D	outside	outside

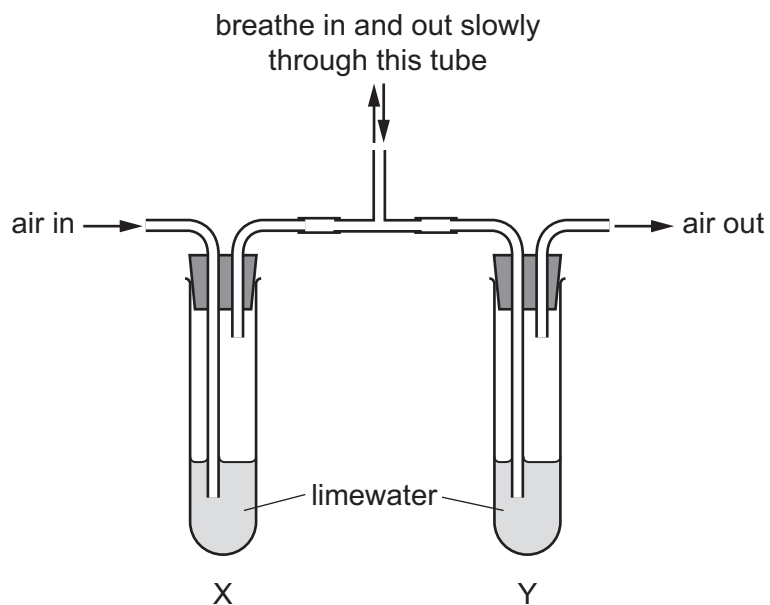
- 6 The table shows two plant tissues with their possible functions.

	tissue	functions	
		support	transport
1	phloem	✓	✓
2	phloem	x	✓
3	xylem	✓	✓
4	xylem	✓	x

Which rows show the correct functions for phloem and xylem?

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

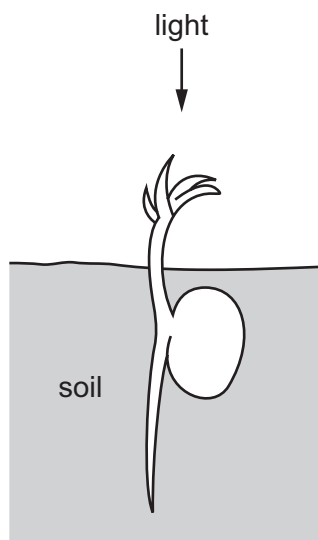
- 7 A student uses the apparatus shown to investigate the composition of inspired and expired air.



What is the appearance of the limewater after one minute of breathing in and out?

	tube X	tube Y
A	clear	clear
B	clear	cloudy
C	cloudy	clear
D	cloudy	cloudy

- 8 The diagram shows a germinating seed.



What does the germinating seed show?

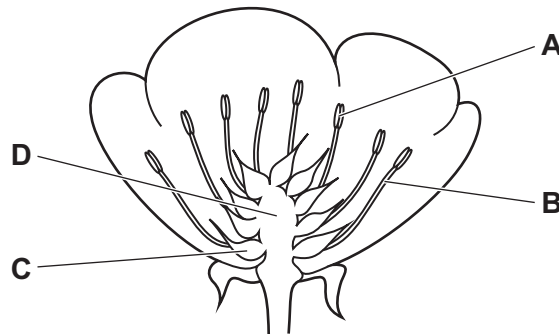
	shoot	root
A	negative phototropism	negative gravitropism
B	negative phototropism	positive gravitropism
C	positive phototropism	negative gravitropism
D	positive phototropism	positive gravitropism

- 9 Which row describes asexual reproduction?

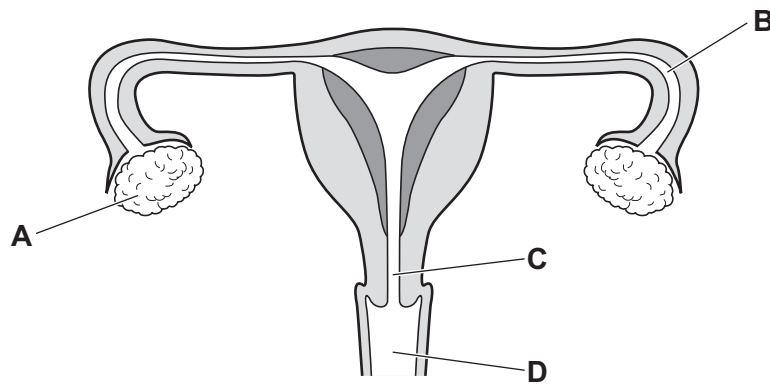
	number of parents	a zygote is produced	offspring identical to the parent
A	1	no	yes
B	1	yes	no
C	2	no	yes
D	2	yes	no

10 The diagram shows a section through a buttercup flower.

Which structure produces pollen grains?



11 Where does fertilisation take place?

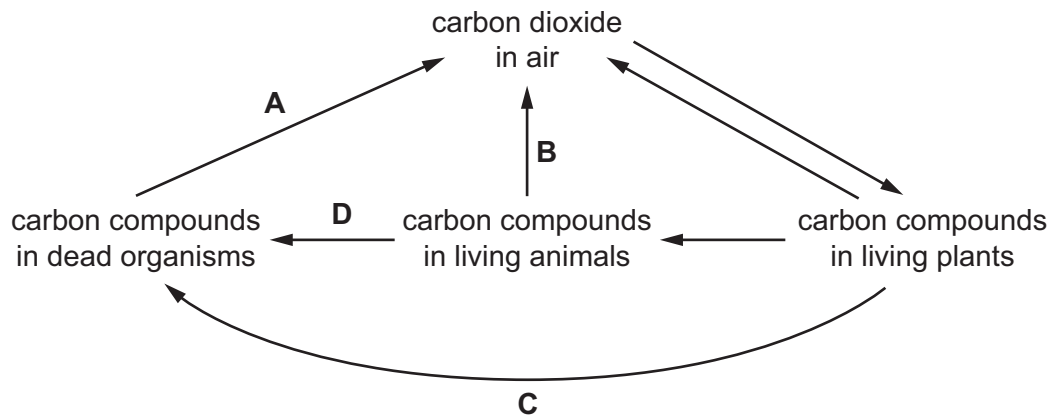


12 Which organism makes its own organic nutrients?

- A carnivore
- B decomposer
- C herbivore
- D producer

13 The diagram shows part of the carbon cycle.

Which arrow represents respiration by decomposers?



14 The temperature and pressure of oxygen in two different containers are shown.

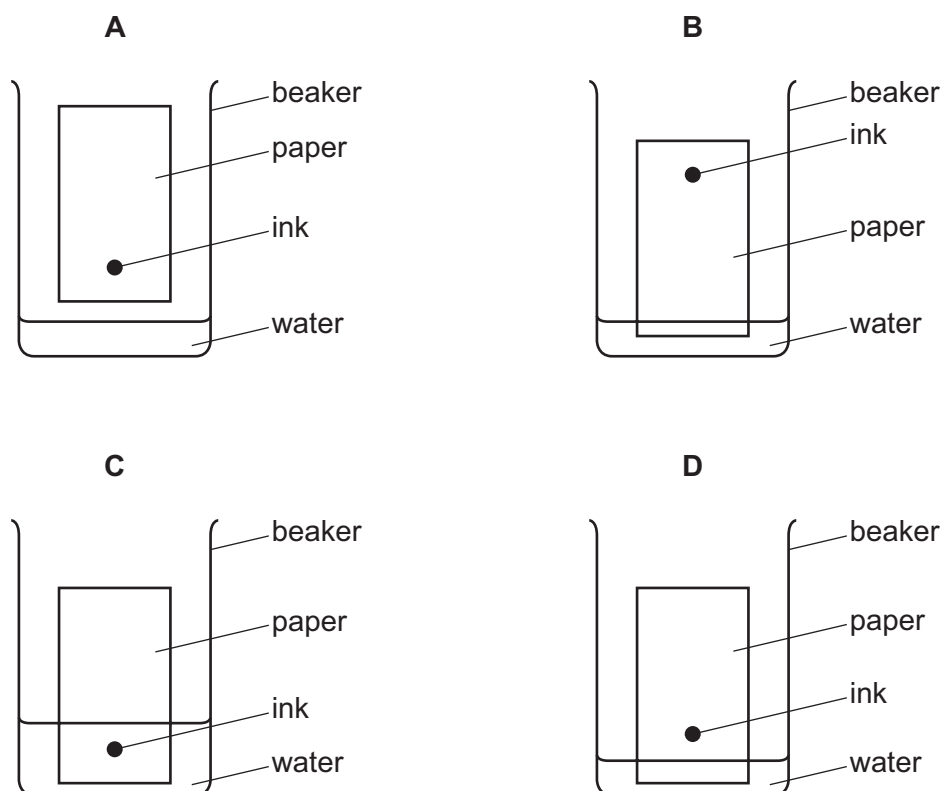
	temperature /°C	pressure kN/m ²
container 1	20	200
container 2	50	150

Which statement about the oxygen molecules in container 1 compared to container 2 is correct?

- A** In container 1 they are closer together and moving faster.
- B** In container 1 they are closer together and moving slower.
- C** In container 1 they are further apart and moving faster.
- D** In container 1 they are further apart and moving slower.

15 Chromatography separates ink into different colours.

Which diagram shows how the apparatus is set up?



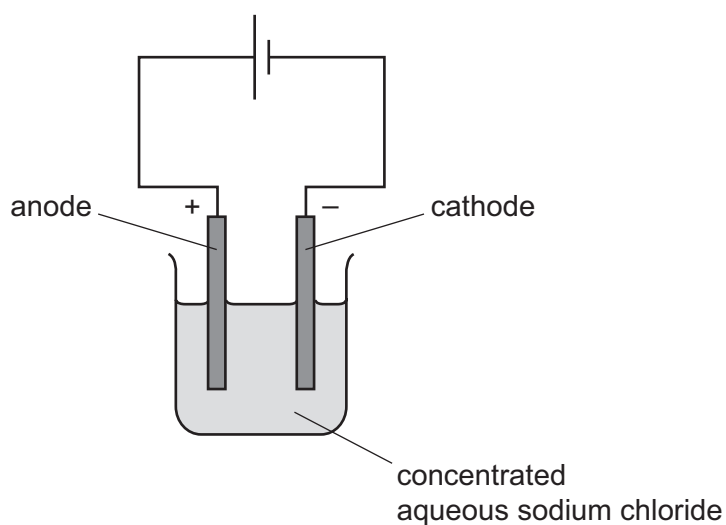
16 Which statement about non-metals is correct?

- A** They are in Group I of the Periodic Table.
- B** They are malleable and have high melting points.
- C** They react with acids to form hydrogen gas.
- D** They react with other non-metals to form covalent compounds.

17 Which row correctly identifies formulae for acids and for alkalis?

	acids	alkalis
A	HNO_3 and H_2SO_4	NaOH and KOH
B	HNO_3 and H_2SO_4	HCl and KOH
C	HCl and KOH	H_2SO_4 and HNO_3
D	NaOH and KOH	HNO_3 and H_2SO_4

- 18** The apparatus for the electrolysis of concentrated aqueous sodium chloride using inert electrodes is shown.



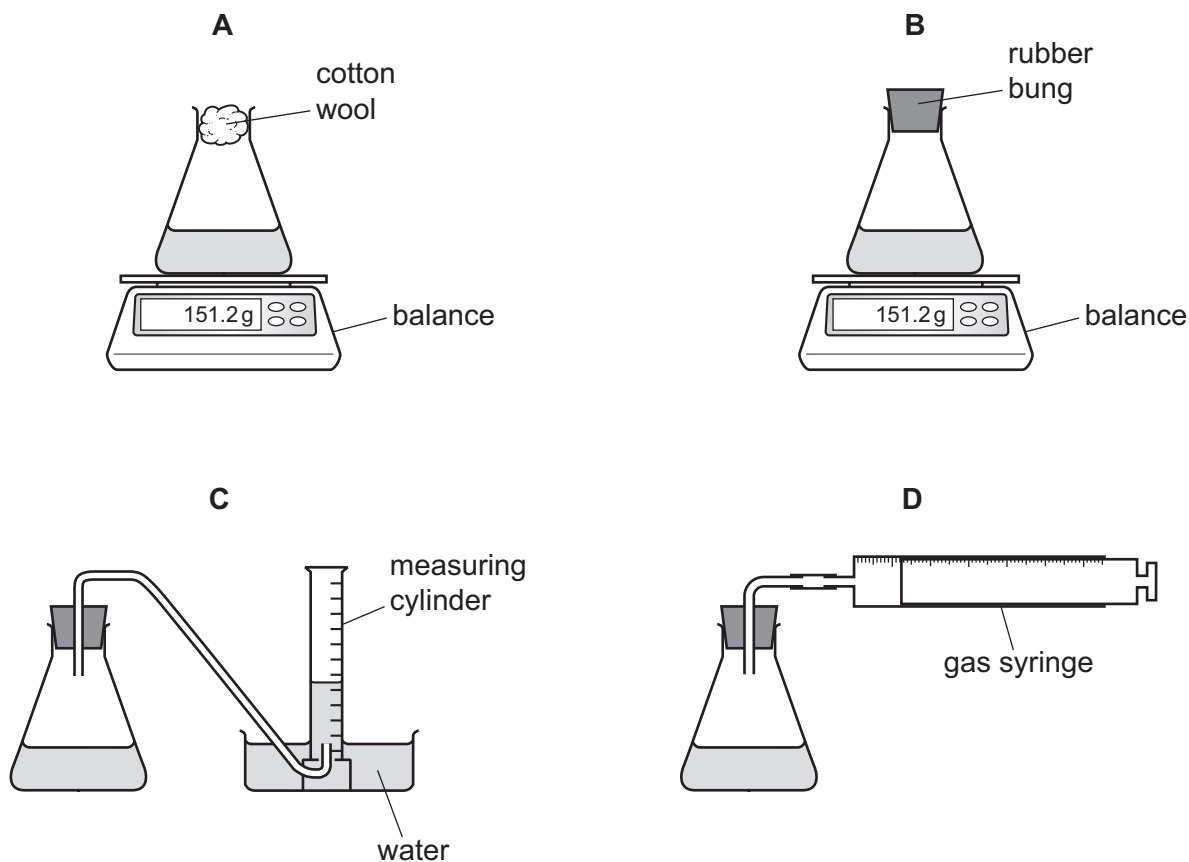
Which statement about this electrolysis is correct?

- A** A gas, which turns red litmus blue, is produced at the anode.
 - B** Hydrogen is produced at the cathode.
 - C** Oxygen is produced at the anode.
 - D** Sodium can be used for the inert electrodes.
- 19** Which temperature changes occur during exothermic and endothermic reactions?

	exothermic	endothermic
A	decreases	increases
B	decreases	no change
C	increases	decreases
D	increases	no change

20 Dilute hydrochloric acid reacts with magnesium to form magnesium chloride and hydrogen.

Which apparatus is **not** suitable for use in investigating the rate of this reaction?



21 Which two substances both react with dilute sulfuric acid to make the salt magnesium sulfate?

- A magnesium carbonate and magnesium chloride
- B magnesium chloride and magnesium nitrate
- C magnesium oxide and magnesium carbonate
- D magnesium oxide and magnesium nitrate

22 Acid X reacts with metal Y.

A colourless gas is given off and a pale green solution is produced.

Two tests are carried out on the solution.

test	reagent(s) added	result
1	aqueous silver nitrate and nitric acid	white precipitate
2	aqueous sodium hydroxide	green precipitate

What are acid X and metal Y?

	acid	metal
A	hydrochloric	iron
B	hydrochloric	zinc
C	sulfuric	iron
D	sulfuric	zinc

23 The diagram shows Period 3 of the Periodic Table.

I	II	III	IV	V	VI	VII	VIII
V		W	X			Y	

Which two elements are metals?

- A** V and W **B** V and X **C** W and X **D** X and Y

24 Some physical properties of four elements are shown.

Which element can act as a catalyst?

	melting point / °C	conductivity as a solid	density g/cm ³
A	98	good	0.97
B	113	poor	2.07
C	1455	good	8.9
D	1683	poor	2.32

25 Which method is used to extract copper from copper(II) oxide?

- A** dissolving copper(II) oxide in hydrochloric acid and then filtering
- B** dissolving copper(II) oxide in water and then filtering
- C** heating the copper(II) oxide
- D** heating the copper(II) oxide mixed with carbon

26 Decane is a hydrocarbon.

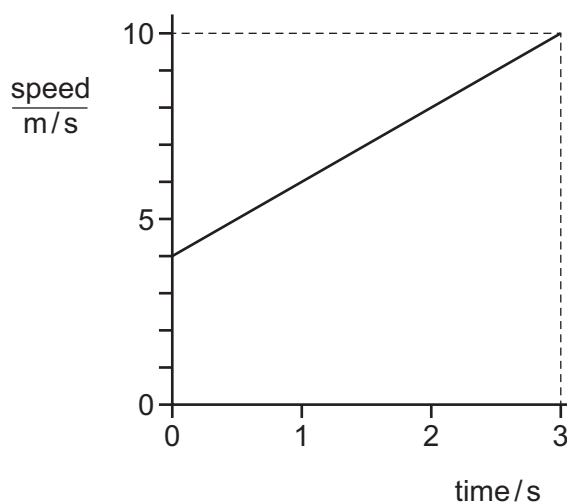
Which greenhouse gas is made during the complete combustion of decane?

- A** carbon dioxide
- B** carbon monoxide
- C** hydrogen
- D** methane

27 Which statement describes a hydrocarbon?

- A** a compound that burns to form carbon dioxide and hydrogen
- B** a compound that contains carbon and hydrogen only
- C** a compound that only contains ionic bonds
- D** a compound that reacts easily with metals

28 The diagram shows a speed–time graph for an object.



What is the average speed of the object?

- A** 2.0 m/s
- B** 4.0 m/s
- C** 7.0 m/s
- D** 10 m/s

- 29 The gravitational field strength is 10 N/kg .

What is the mass of an object that has a weight of 5.0 N ?

- A** 0.50 kg **B** 2.0 kg **C** 5.0 kg **D** 50 kg

- 30 A solid metal cube of side 5.0 cm has a mass of 250 g .

What is the density of the metal?

- A** 0.50 g/cm^3 **B** 2.0 g/cm^3 **C** 10 g/cm^3 **D** 50 g/cm^3

- 31 A student carrying a bag walks up some stairs at a constant speed.

Which change does **not** affect the power developed by the student?

- A** carrying a heavier bag
B walking at a higher constant speed
C walking at a lower constant speed
D walking half-way up the stairs

- 32 Which energy source is non-renewable?

- A** geothermal
B hydroelectric
C nuclear fission
D wind

- 33 Which row shows how molecules in a solid and a liquid are arranged?

	solid	liquid
A	regularly	regularly
B	regularly	not regularly
C	not regularly	regularly
D	not regularly	not regularly

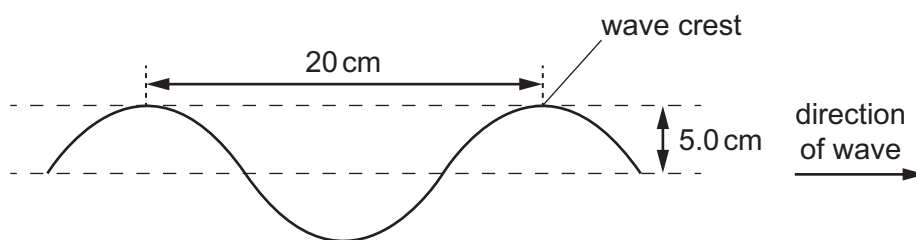
34 In which states of matter can convection occur?

	in a solid	in a liquid	in a gas
A	no	no	yes
B	no	yes	yes
C	yes	no	no
D	yes	yes	no

35 The diagram shows a section of a rope.

Four wave crests pass a point on the rope every second.

Each wave crest travels 80 cm in one second.

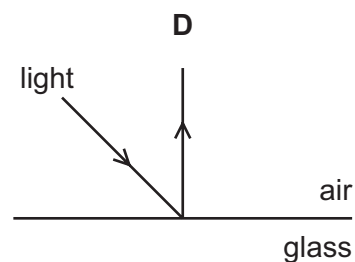
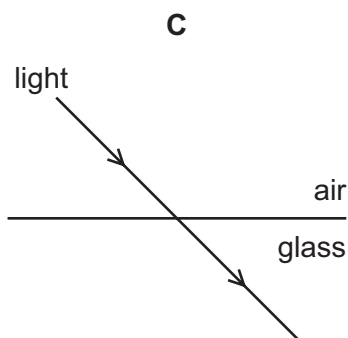
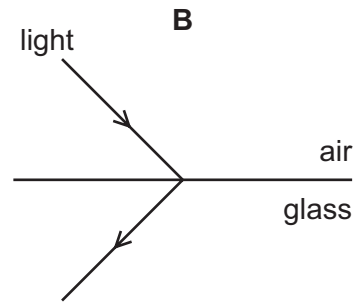
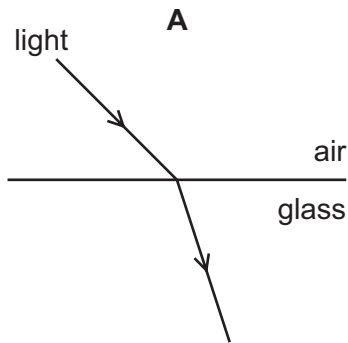


What is the speed of the wave?

- A** 4.0 cm/s **B** 5.0 cm/s **C** 20 cm/s **D** 80 cm/s

36 Light travelling in air strikes a glass block.

Which diagram shows what happens to the light?



37 Two sounds with the same frequency are produced by a loudspeaker.

The first sound has a large amplitude.

The second sound has a smaller amplitude.

How do the two sounds compare?

- A** The second sound is higher pitched.
- B** The second sound is lower pitched.
- C** The second sound is louder.
- D** The second sound is quieter.

38 A plastic rod can be charged by friction. This happens when some particles are added to or removed from the rod.

Which particles are added or removed?

- A** electrons
- B** ions
- C** neutrons
- D** protons

39 A power supply causes a current in a circuit.

The electromotive force (e.m.f.) of the power supply and the resistance of the circuit are both changed.

Which pair of changes **must** result in a smaller current in the circuit?

	e.m.f.	resistance
A	decreased	decreased
B	decreased	increased
C	increased	decreased
D	increased	increased

40 What is the purpose of a fuse in an electrical appliance?

- A** to maintain the correct current in the appliance
- B** to maintain the correct voltage across the appliance
- C** to prevent the insulation around the cables from becoming too thin
- D** to protect the wires from overheating when the current is too large

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The Periodic Table of Elements

Group																	
I	II	1 H hydrogen 1										III	IV	V	VI	VII	VIII
3 Li lithium 7	4 Be beryllium 9	Key atomic number atomic symbol name relative atomic mass										5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
	11 Na sodium 23											12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —
87 Fr francium —	88 Ra radium —	89–103 actinoids	104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —	114 Fl flerovium —	116 Lv livermorium —				

lanthanoids

actinoids

57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).